

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification<sup>6</sup>:

E06B 9/08 // E05D 15/24

A1

(11) International Publication Number:

WO 98/10165

(43) International Publication Date:

12 March 1998 (12.03.98)

(21) International Application Number: PCT/DK97/00339

(22) International Filing Date: 21 August 1997 (21.08.97)

(30) Priority Data:

0934/96

2 September 1996 (02.09.96)

DK

(71) Applicant (for all designated States except US): FORENIN-  
GEN AF LEVERANDØRER AF INDUSTRIPORTE I  
DANMARK [DK/DK]; c/o Nassau Doore a/s, Kroaggervej  
2, DK-5750 Ringe (DK).

(72) Inventor; and

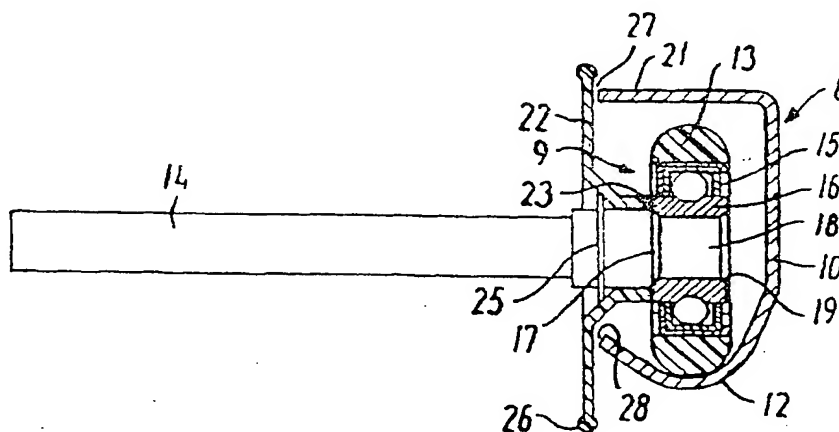
(75) Inventor/Applicant (for US only): FABECH-LARSEN, Jan  
[DK/DK]; Bækvej 13, Tårup, DK-5871 Frørup (DK).(74) Agent: HOLME PATENT A/S; Sankt Peders Stræde 41, DK-  
1453 København K (DK).(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR,  
BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE,  
GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,  
LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ,  
PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR,  
TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH,  
KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ,  
BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE,  
CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL,  
PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN,  
ML, MR, NE, SN, TD, TG).

Published

With international search report.

In English translation (filed in Danish).

(54) Title: ROLL-UP DOOR



## (57) Abstract

A roll-up door (1) comprises a number of mutually hinged sections (5) and a number of rollers (9) which are mounted along the sides of the door and serve to control the door, as the rollers are running in guide rails (8) at the sides of the door. Each guide rail has a U-shaped cross section with a web (10) and two flaps (11; 12). At each roller, a finger-blocking is mounted, which has the shape of, e.g. a disc (22) which, in a relatively short distance, extends to or past at least one of the longitudinal, free edges (27; 28) of the guide rail. Thereby, a person who is at the door, while it is moving, is efficiently prevented from getting his fingers caught between the stationary guide rail and one or more of the running rollers and/or the shafts (14) which carry the rollers.

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Roll-up door

1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

The invention concerns a roll-up door which comprises a number of mutually hinged, mainly horizontally mounted, preferably elongated sections, a number of rollers mounted along each side of the door, and a guide rail mounted on each side of the door, and which is used for accommodating the respective rollers and having a mainly U-shaped cross-section with a web and two flaps.

When the door of a door opening of a building is lifted or lowered, it is guided by the rollers running inside the guide rails, each having a vertical section extending upwards at the door frame and a horizontal section extending inwards into the building, and also a curved section forming the transition between the vertical and horizontal sections.

More specifically, the rollers are running on one of the  
20 flaps of the respective guide rails which, for this purpose,  
can have a cross-sectional shape adapted to the rim of the the  
rollers. The distance between the flaps will, in practice, be  
greater than the thickness of a finger, and a person who is at  
the door could therefore easily get his fingers in between the  
25 flaps. If this happens while the door is moving, there is a  
risk that the fingers will be seriously injured by being run  
over by the rollers and being cut by one of the free edges of  
the guide rail.

30 The object of the invention is to provide a roll-up door of the type mentioned in the opening paragraph by means of which this risk is eliminated.

The novel and unique features according to the invention, whereby this is achieved, is the fact that, at each roller, a finger-barrier is mounted which, at a relatively short

distance, extends to or past at least one of the longitudinal, free edges of the guide rail. A finger grasping behind this edge when the door is moving, is now refused by the finger-barrier before the finger is caught between the flap and the roller. To ensure this advantageous effect, the spacing of the finger-barrier and the free edges of the guide rail must be smaller than the thickness of a finger, and in praxis maximum 8 mm.

10 Usually, each roller is mounted at the end of a shaft which, by means of a roller support, is attached to the door. In these cases, the finger-barrier is advantageously attached to this shaft.

15 The finger-barrier can be a plate covering the guide rail in a sufficiently large area at the associated roller, but at a preferred embodiment, it is a disc mounted co-axially with the roller and having diameter whihc is at least as large as the diameter of the roller.

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At a preferred embodiment, the disc has a hub which, with a force fit, is mounted upon the shaft and secured axially between the roller and a lock ring.

25 Furthermore, the disc can appropriately be made of plastic and have a bead along the periphery to ensure that the disc itself is not able to cut into a finger or a hand.

The invention will be explained in greater details below with  
30 references to the drawings, in which

fig. 1 is a perspective view, seen from the inside of a building, of a roll-up door according to the invention,

35 fig. 2 is a perspective view, in fragments at a larger scale, of a roller running in a guide rail, and

fig. 3 is a lateral view partially in section of the same roller.

Fig. 1 shows a roll-up door 1 seen from within a building 2. The door serves to close a door opening 3 with door frames 4, and is constructed of sections 5 which are hinged together by middle hinges 6 and side hinges 7.

The door can be lifted or lowered for opening and closing the door opening, respectively. During this, the door is guided by guide rails 8 which each are extending upwards at the respective door frame with a small inclination inwards into the building for in a curvature to transit into a section extending horizontally or slantingly into the building.

Fig. 2 and 3 show more explicitly that the door is guided by means of rollers 9 running inside the guide rails 8. For this purpose, the guide rails, seen in cross section, are mainly shaped as U's which are placed with the openings facing each other. Each guide rail has a web 10, an outer flap 11 and an inner flap 12. When the door is lifted or lowered, the roller 9 runs on the inner flap 12. For in all situations to ensure the stability of the door opening, the inner flap 12 is, in this case, seen in cross-section, shaped with a curvature having the same or a slightly larger radius of curvature as the rim 13 of the roller 9.

The rim 13 of the roller 9 is made of e.g. plastic and mounted at the end of a shaft 14 by means of a ball bearing 15 which has an inner race 16 which is pressed against a shoulder 17 on a journal 18 at the end of the shaft 14. Subsequently, the inner race 16 is secured to the journal 18 by deforming the material 19 at the terminal surface of the journal.

The shaft 14 is fixed upon a roller support 20 having slits 21 for adjusting the location of the shaft on the roller support which itself is mounted on a side hinge 7, known per se.

5 On the shaft 14, there is furthermore mounted a disc 22 which for example can be made of plastic. The disc has a hub 23 which is mounted with a force fit, such that it is abutting the inner race 16 on a shaft section 24 which has a slightly larger diameter than the journal 18. The shoulder 17 forms the  
10 transition between the shaft section 24 and the journal 18. A locking ring 25 ensures, together with the inner race 16, the axial position of the disc 22 on the shaft. To facilitate the mounting of the disc 22, the locking ring 25 can preferably be of the type which has inwards turned teeth for automatically  
15 locking the ring when it is pushed across a smooth shaft section.

As will appear from the above explanation, the disc 22 is mounted co-axially with the roller 9. Furthermore, the disc  
20 has a diameter so large that it, in the cross-section shown in fig. 3, extends beyond as well the free edge 27 of the outer flap 11 as the free edge 28 of the inner flap 12. The distance of the disc to these edges is at least so small that it is not possible to get a finger in between the disc and the edges.  
25 The distance is thus typically smaller than 8 mm.

The disc 22 therefore makes up a finger-barrier which efficiently prevents a person who is at the door while this is moving, from getting his fingers caught between the stationary  
30 guide rail and the running roller and/or the shaft of said roller.

As previously mentioned, the disc can be made of plastic. Even if the plastic has a relatively small thickness, it must have  
35 sufficiently great strength and rigidity to, with certainty, be able to reject fingers which a person might unintentionally

have put in between the flaps while the door is being lifted or lowered.

As shown in fig. 3, the disc 22 has, along the periphery, a bead 26 which ensures that the disc itself does not cut a finger. Furthermore, the bead 26 serves to strengthen the edge.

The invention is shown in the drawings and described above as a disc-shaped finger-barrier. However, this only serves as an example, as many other embodiments are possible within the scope of the invention.

Thus, the finger-barrier can also be shaped as a rectangular plate and be mounted upon the roller shaft in any appropriate way.

The disc or the plate do not necessarily have to extend perpendicular to the axis of the roller, but can advantageously have sections which are more or less folded around the outer sides of the flaps. At the same time, other sections can be folded in over the roller at both sides via the opening of the guide rail. These folded sections enhance the safety provided by the finger-barrier according to the invention from getting the fingers caught between the guide rail and the roller with its associated shaft, when the door is moving.

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Abstract    Introduction    Methods    Results    Discussion    Conclusion    Acknowledgements    References

1. A roll-up door which comprises a number of mutually  
5 hinged, mainly horizontally mounted, preferably elongated  
sections, a number of rollers mounted along each side of the  
door, and a guide rail which is mounted on each side of the  
door and is used for accommodating the respective rollers and  
have a mainly U-shaped cross-section with a web and two flaps,  
10 **characterized** in that, at each roller, a finger-barrier is  
mounted which, within a relatively short distance, extends to  
or past at least one of the longitudinal, free edges of the  
guide rail.
- 15 2. A roll-up door according to claim 1, **characterized** in  
that the spacing between the finger-barrier and at least one  
of the longitudinal, free edges of the guide rail is maximum 8  
mm.
- 20 3. A roll-up door according to claim 1 or 2, and where the  
roller is mounted at the end of a shaft which, by means of a  
roller support, is attached to the door, **characterized** in that  
the finger-barrier is attached to the shaft.
- 25 4. A roll-up door according to claim 1, 2 or 3,  
**characterized** in that the finger-barrier preferably has the  
shape of a plate which, in the longitudinal direction of the  
guide rail, extends outwards from the axis of the roller in a  
distance which is at least as large as the radius of the  
30 roller.
5. A roll-up door according to each of the claims 1 - 4,  
**characterized** in that the finger-barrier is a disc mounted  
co-axially with the roller and having a diameter which is at  
35 least as large a diameter as the roller.



6. A roll-up door according to claim 5, characterized in that the disc has a bead along the periphery.

7. A roll-up door according to claim 5 or 6, characterized in that the disc has a hub with a central opening which fits the shaft at the place of this where the disc is mounted.

8. A roll-up door according to claim 7, characterized in that the fit is a force fit.

9. A roll-up door according to claim 7 or 8, and where the roller is mounted on the shaft by means of a ball bearing, characterized in that one end of the hub is abutting the inner race of the ball bearing and that the other end is locked with a locking ring.

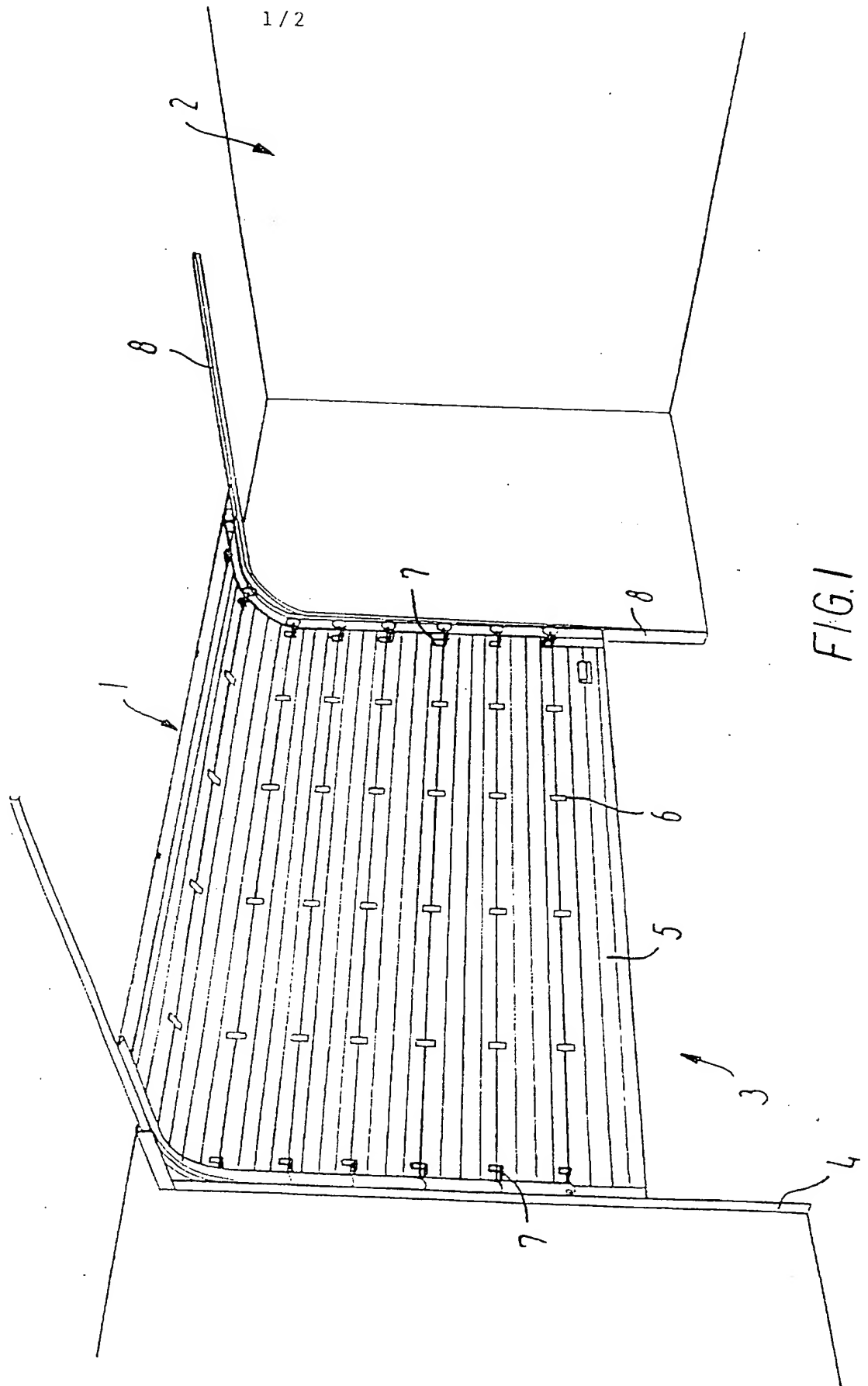
10. A roll-up door according to each of the claims 1 - 9, characterized in that the finger-barrier is made of plastic.

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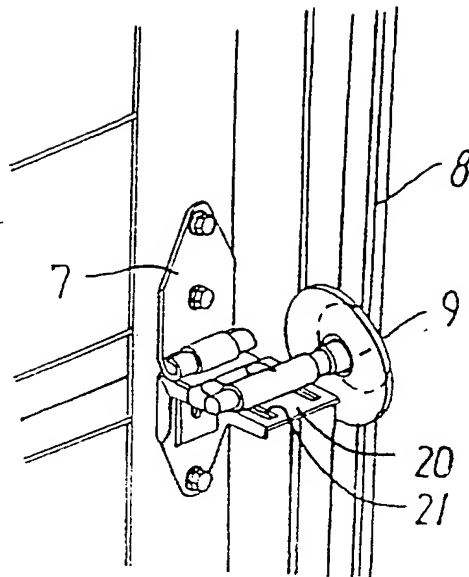


FIG. 2

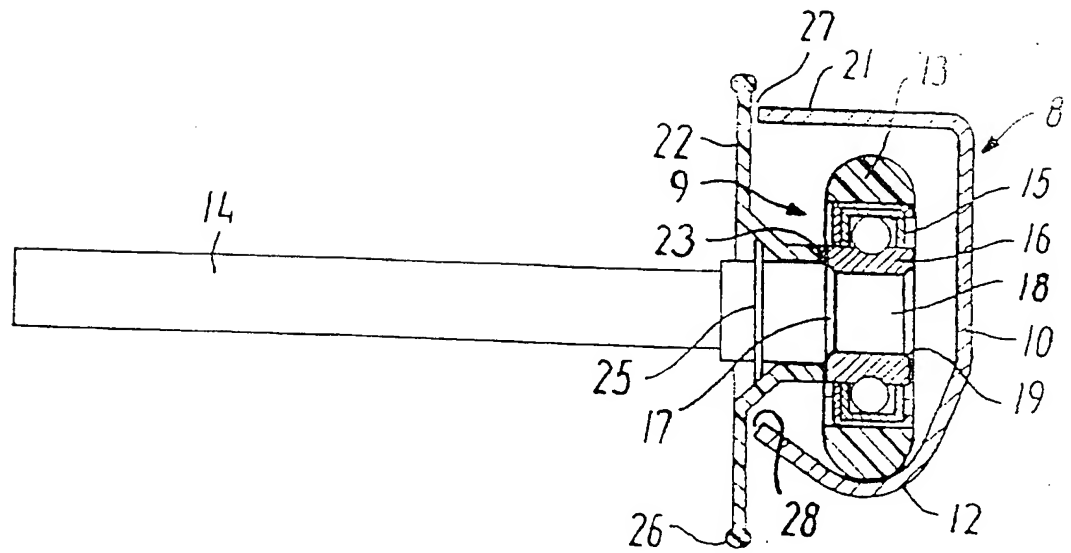


FIG. 3

1  
INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 97/00339

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: E06B 9/08 // E05D 15/24

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: E06B, E05D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	SE 467669 B (FERMETURES PEYRICHOU-MALAN SA), 24 August 1992 (24.08.92), figures 6-8, details 23,30 --	1,2
A	DE 4015216 A1 (SEAFLEX TRANSPORT UND LAGERTECHNIK GMBH), 14 November 1991 (14.11.91), figure 3, detail 50 --	1-10
A	US 5022185 A (D.K. OATMAN), 11 June 1991 (11.06.91), figure 4, detail 12, abstract --	1-10

☐ Further documents are listed in the continuation of box C.

☒ See patent family annex.

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Date of the actual completion of the international search

24 November 1997

Date of mailing of the international search report

03-12-1997

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INTERNATIONAL SEARCH REPORT  
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